temperature was relatively hot for the area (approximately 30°C). Before treatment could be initiated, the bird suffered what was described to me as a shock-like death. On gross postmortem at a Diagnostic Laboratory in the south, the distal metatarsal was found to be fractured. As there were no macroscopic lesions suggestive of capture myopathy, a histological examination of the muscle was not performed.

Because of their limited numbers, virtually nothing is known of capture myopathy in whooping cranes. Fowler (1978. Zoo and Wild Animal Medicine, W. B. Saunders, Toronto. 951 pp.) in a general description of the handling and restraint of gruiforms in captivity makes mention of how excitable they can be and how the cramping of their legs may cause a "necrotizing myopathy." Several of us attending the 1982 Annual Meeting of the Wildlife Disease Association at Madison visited the International Crane Foundation. Their breeding whopping crane female had just died because the passage of a low flying aircraft had so alarmed her that she had damaged herself irreparably on the cage. Windingstad et al. (1983. J. Wildl. Dis. 19:289–290) described capture myopathy in a young sandhill crane, *Grus canadensis*, and Sparker et al. (1987. J. Wildl. Dis. 23:447–453) found that without histopathology almost all capture myopathy in wild turkeys, *Meleagris gallopavo*, would be overlooked and also that the condition was 4.3× more prevalent in immature birds. Based on its presence in related species, the history of an exhausting and unrestricted chase, the age of the bird, the hot weather, the cramping of the bird's legs, the trauma, the clinical symptoms and a shock-like death within a few hours post capture, capture myopathy must be considered as the probable cause of the bird's death despite the lack of macroscopically visible lesions.

Lately the Wildlife Disease Association has had much discussion of capture programs. Harthoorn (1981. Proc. 4th Int. Conf. Wildl. Dis. Assoc., pp. 248–252) found that conditioning, training, and taming of groups of wild animals almost completely eliminated the approximately 50% mortality associated with older, exertionally dependent methods of capture. Spraker et al. (op. cit.) thought wild turkeys were extremely susceptible to exertional stress, and recommended drop nets that caused them to struggle not be used. Kock et al.'s (1987. J. Wildl. Dis. 23:634–662) evaluation of bighorn sheep, *Ovis canadensis*, capture methods associated the level of exertion, stress and the use of capture drugs with injury and death. All of these studies imply that with our knowledge of capture myopathy and other capture related losses that the old "gung ho" methods of capture involving the chase of an animal until it collapses from exhaustion and overexertion are no longer appropriate to the wildlife management profession. *Bob Gainer, Northwest Veterinary Service.*

National Wildlife Health Research Center Quarterly Mortality Report. The following summarizes mortalities reported to NWHR for April–June 1988.

NWHRC received reports of 37 wildlife disease die-offs. Avian botulism accounted for 30% of the die-offs and duck plague 16%.

The occurrence of duck plague in six areas of the United States in 1988 is noteworthy, as this disease was not reported to the Center in 1987. The die-offs in Washington state are the first reported to NWHR from that area.

Salmonella typhimurium was isolated from pine siskins collected in Vermont. Salmonellosis was suspected to have caused mortality of hundreds of passerines including pine siskins, black-capped chickadees, house sparrows, evening grosbeaks, common redpolls, American goldfinches, cardinals, cowbirds, and grackles in late March and April in Vermont, New Hampshire, Massachusetts, and New York. As previously reported, Salmonellosis also caused the death of passerines at Devils Lake, Wisconsin, during January; Shawano, Wisconsin, in March; and Kountze, Texas, in May.

Approximately 20 mallards and pintails were found sick or dead in Yellowstone County, northeast of Billings, Montana. Necropsy examination of carcasses revealed a parasitic enteritis and massive numbers of flukes later identified as *Sphaeridiotrema globulus*. Stomach contents included remnants of snails of the family Amnicolidae, suspected to be the intermediate host.

Three epizootics in Wisconsin and Michigan involved tree swallows found sick or dead in bluebird boxes. Clinical signs included weakness and pasting of the vent. Birds submitted from Wisconsin had no gross lesions at necropsy; they were significantly underweight. Biologists suspect drought conditions reduced availability of insects for food.

Salton Sea National Wildlife Refuge and an adjacent duck club reported avian botulism losses after poor quality water entered the Refuge. Botulism usually occurs only in August and September on these areas.

QUARTERLY DIE-OFF REPORT

April 1988–June 1988
National Wildlife Health Research Center

Location	Date	Species	Mortality	Causes
Colusa NWR, CA	12/1/87–1/22/88	Snow geese, Ross' geese, California gulls	6	Avian cholera, botulism type C
Various locations in VT, NY, & NH	2/8/88–4/15/88	Pine siskins	100 (e)	Salmonellosis[1]
Forest Lake, Twin Cities, MN	3/10/88–3/11/88	Mallards	15	Toxin: OP or Carbamate
Imbler, OR	3/14/88–4/18/88	Tundra swans, mallards, wigeons	27	Avian cholera, aspergillosis
Corinth, VT	3/25/88–3/30/88	Barred owls	4	Open
William L. Finley NWR, OR	3/28/88–4/15/88	Dusky Canada geese, Taverners Canada geese	2	Open
Columbus, OH	3/30/88–4/8/88	Muscovy ducks	4	Duck plague
Alliance, NE	4/4/88–4/11/88	Snow geese	17	Avian cholera
Salton Sea NWR, CA	4/8/88–4/18/88	Shovelers, western sandpipers, green-winged teals, ruddy ducks	324	Botulism type C
Uintah, UT	4/8/88–4/8/88	Sandhill cranes	13	Toxin: OP suspect
Kountze, TX	4/10/88–5/3/88	Cardinals, chipping sparrows	20 (e)	Salmonellosis
Needles, CA	4/15/88–5/15/88	Mourning doves	20	Trichomoniasis suspect[1]
Appleton, WI	4/16/88–6/13/88	Tree swallows	60	Open/emaciation
Shady Acres Gun Club, CA	4/21/88–5/5/88	Shovelers, green-winged teals, American avocets, ruddy ducks	595	Botulism type C
Gettysburg, SD	4/26/88–5/10/88	Redhead ducks, ring-necked ducks, scaup ducks, pectoral sandpipers	400 (e)	Botulism type C
Allen's Pond, MD	5/1/88–5/14/88	Muscovy ducks	12	Duck plague[1]
Wells Beach, ME	5/2/88–5/15/88	Common loons	6 (e)	Open
Cambridge, MD	5/3/88–5/4/88	Muscovy ducks	1	Duck plague[1]
Eagle River Flats, AK	5/9/88–ongoing	Mallards, green-winged teals, shovelers, pintails	33	Open
Hiawatha Nat'l Forest, MI	5/12/88–6/18/88	Tree swallows	17	Open[1]
Waterloo, WI	5/17/88–5/23/88	Tree swallows	26	Open/emaciation
Corcoran Sewer Ponds, CA	5/18/88–ongoing	American coots, mallards, cinnamon teals, ruddy ducks	102	Suspect avian botulism[1]
Puyallup, WA	5/20/88–5/20/88	Muscovy ducks	2	Duck plague[1]
Black Diamond, WA	5/21/88–5/21/88	Muscovy ducks	1	Duck plague[1]
Mt. Airy, LA	5/23/88–5/30/88	Little blue herons, snowy egrets, cattle egrets, Louisiana herons	7	Open intestinal nematodiasis
Woodhaven Shores, VA	6/7/88–6/7/88	Hybrid mallards	1	Duck plague[1]
Long Lake NWR, ND	6/7/88–ongoing	Gulls, white pelicans, shovelers, mallards	300 (e)	Botulism type C
Upper Mississippi NWR, WI	6/13/88–ongoing	Mallards	250 (e)	Botulism type C
Horicon NWR, WI	6/13/88–ongonig	Mallards, unidentified teals, American coots	53	Botulism type C
Eastern Egg Island, ME	6/16/88–6/20/88	Common terns, Leach's storm-petrels	35	Botulism type C
Medicine Lake NWR, MT	6/17/88–ongoing	Green-winged teals, gadwalls, Unidentified ducklings	35 (e)	Botulism type C
Devils Lake WMD, ND	6/20/88–ongoing	Wood ducks, eared grebes, mallards, gadwalls	150 (e)	Botulism type C

QUARTERLY DIE-OFF REPORT

April 1988–June 1988
(Continued)

Location	Date	Species	Mortality	Causes
Denver, CO	6/22/88–ongoing	B. crowned night-herons, Canada geese, mallards, Pekin ducks	7	Avian botulism suspect
Cedar Point NWR, OH	6/27/88–ongoing	Mallards	5 (e)	Avian botulism suspect

(e) = estimated mortality.
[1] = no specimens submitted to NWHRC.

For specific information, contact the following Resource Health Team members: Pacific Flyway—Kathryn Converse, Central Flyway—Ronald Windingstad, and Mississippi and Atlantic Flyways—Chris Franson.

National Wildlife Health Center
6006 Schroeder Road
Madison, Wisconsin 53711, USA
(608) 271-4640 or FTS 634-5411

Causes

Avian cholera, botulism type C
Salmonellosis[1]

Toxin: OP or Carbamate

Avian cholera, aspergillosis
Open
Open

Duck plague
Avian cholera
Botulism type C

Toxin: OP suspect
Salmonellosis

Trichomoniasis suspect[1]
Open/emaciation
Botulism type C

Botulism type C

Duck plague[1]
Open
Duck plague[1]
Open

Open[1]

Open/emaciation
Suspect avian botulism[1]

Duck plague[1]
Duck plague[1]
Open intestinal nematodiasis

Duck plague[1]

Botulism type C

Botulism type C

Botulism type C

Botulism type C

Botulism type C

Botulism type C